

REMARKS

Claims 2-27, 29 and 31 are pending in the Application.

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Amult* { Claims 13-27 have been withdrawn from consideration.

Claims 2-4, 12, 29 and 31 stand rejected.

Claims 5-11 stand objected to.

I. ELECTION/RESTRICTION

The Applicants appreciate the withdrawal of the restriction requirement on the grounds that the groups represented unrelated subcombinations in response to the Applicants traverse. The Applicants further appreciate the Examiner's concern in raising a new basis for restriction at this stage of the prosecution. However, the Applicants note that the raising of this new basis has deprived the Applicants the opportunity to traverse the newly asserted grounds.

II. OBJECTION TO THE SPECIFICATION

The Examiner has objected to the Specification in view of the omitted serial numbers in the cross-reference to related applications. The Applicants have hereinabove amended the cross-references to related Applications accordingly.

III. REJECTION UNDER 35 U.S.C. §102

Claim 2 has been rejected under 35 U.S.C. §102 as being anticipated by *Kaplit*, U.S. Patent No. 4,498,781 ("the *Kaplit* reference"). Additionally, claims 2 and 12 have been rejected under 35 U.S.C. §102 as being anticipated by *Salem*, U.S. Patent No. 4,488,824 (the *Salem* reference"). The Applicants respectfully traverse the rejection of claims 2 and 12 under 35 U.S.C. §102.

Claim 2 is directed to a circuit including an input, an output, a chopper stabilized, multi-stage feedforward amplifier connected between the input and the output and an analog-to-digital (A/D) converter connected between the amplifier and the output. Claim 2 has been rejected on the teaching in the *Kaplit* reference directed to a conventional logarithmic amplifier comprising operational amplifiers 66 and 68 and transistors 78A and 78B. (See Paper No. 16, page 3.) The *Kaplit* reference teaches that operational amplifiers 66 and 68 are commercially available, chopper stabilized, operational amplifiers, Intersil, Inc., ICL7650 devices. (The *Kaplit* reference, column 3, lines 56-57.) Consequently, neither operational amplifier 66 nor operational amplifier 68 would be understood by those of ordinary skill in the art to be chopper stabilized multi-stage feedforward amplifiers. Furthermore, as noted hereinabove, the circuitry including amplifiers 66 and 68 and transistors 78A and 78B constitute a conventional logarithmic ratioing circuit in which the output forms the logarithm of a ratio of two input signals, namely i_{ref} and i_{meas} by summing a voltage proportional to the logarithm of these two signals. Consequently, the Applicants respectfully submit that one of ordinary skill in the art would not understand the logarithmic ratioing circuit of the *Kaplit* reference to be a chopper stabilized, multi-stage feedforward amplifier.

Therefore, because anticipation requires that a single prior art reference teach the identical invention as recited in the claim, the Applicants respectfully contend that the *Kaplit* reference does not anticipate claim 2. See MPEP §2131. Therefore, claim 2 is allowable under 35 U.S.C. §102 over the *Kaplit* reference.

Claim 2 has also been rejected over the *Salem* reference in reliance on teaching in the *Salem* reference drawn to a band gap voltage reference temperature sensor. (Paper No. 16, page 4.) In particular, amplifiers 28 and 60 are asserted to be a chopper stabilized multi-staged feedforward amplifier. However, the *Salem* reference teaches that amplifier 28 is a conventional, commercially available chopper stabilized operational amplifier, namely an ICL7650. (The *Salem* reference, column 4, lines 16-18.) Amplifier 50 is a conventional operational amplifier (not a chopper stabilized device) namely a National Semiconductor Type LM358. (The *Salem* reference, column 4, lines 19-20.) Additionally, operational amplifier 50 is used as a conventional algebraic summing

amplifier having unity gain that outputs the algebraic sum of the signals at its inverting (54) and non-inverting (49) inputs. (The *Salem* reference, column 5, lines 58-62.) Amplifier 28 amplifies the difference between a thermocouple (comprising hot junction 11 and cold junction 22 and 24) coupled to the non-inverting input (27) and a reference voltage that establishes the zero of temperature. (The *Salem* reference, column 5, lines 13-45.) The gain of amplifier 28 is set so that the rate of voltage change per degree of temperature of the thermocouple voltage matches that of the band gap device (41) that provides the measure of the absolute temperature of the thermocouple cold junction. (The *Salem* reference, column 5, lines 46-50.) Thus, amplifier 28 is a conventional chopper stabilized operational amplifier operated as a differential amplifier with gain, and not disclosed to be a chopper stabilized multi-stage feedforward amplifier.

Because, for at least the aforesaid reasons, the *Salem* reference does not teach the identical invention of claim 2, the *Salem* reference does not anticipate claim 2. MPEP §2131. Therefore, claim 2 is allowable under 35 U.S.C. §102 over the *Salem* reference.

Claim 12 is directed to the circuit of claim 2 fabricated on an integrated circuit. Claim 12 has been rejected on teaching by the statement in the *Salem* reference disclosing that it is an object of the invention "to provide a thermocouple type sensing device which can be used with integrated circuits." (The *Salem* reference, column 2, lines 7-8.) Consequently, the *Salem* reference does not disclose a circuit as recited in claim 2 fabricated on an integrated circuit. Thus, the *Salem* reference does not teach the identical invention of claim 12 and therefore, claim 12 is allowable under 35 U.S.C. §102 over the *Salem* reference.

IV. REJECTION UNDER 35 U.S.C. § 103

Claims 3, 4, 12, 29 and 31 have been rejected under 35 U.S.C. §103 as being unpatentable over the *Kaplit* reference. The Applicants respectfully traverse the rejections of claims 3, 4, 12, 29 and 31 under 35 U.S.C. §103. Claim 3 depends from claim 2 and is directed to the circuit thereof in which the analog to digital converter is a delta-sigma modulator. The Examiner admits that the *Kaplit* reference does not teach a delta-sigma modulator A/D. (Paper No. 16, page 4.) The

Examiner asserts, however, that with the advance of technology it would have been obvious at the time of the invention that is made for one skilled in the art to realize that the A/D of the *Kaplit* reference could be implemented as a delta-sigma modulator. (Paper No. 16, page 5.) The Applicants respectfully disagree. The *Kaplit* reference teaches that the A/D converter is a dual slope A/D. (The *Kaplit* reference, column 3, line 25.) As an initial matter, the Examiner does not provide a rationale, or evidence of likelihood of success in the reference itself for substituting the dual slope A/D of the *Kaplit* reference with a delta-sigma modulator. See MPEP §2143. Moreover, the *Kaplit* reference relies on a dual chopper A/D in which the integration time period of the dual slope A/D is an integer multiple of the chopping time period of the chopper stabilized amplifiers (66 and 68). (The *Kaplit* reference, column 4, lines 49-52.) This arrangement makes the output of the chopper stabilized amplifiers (66 and 68) compatible with the dual slope A/D. (The *Salem* reference, column 4, lines 43-45.) Therefore, the Applicants respectfully contend that a showing of likelihood of success in grafting a delta-sigma modulator into the *Kaplit* reference for the dual slope A/D of the *Kaplit* reference cannot be predicated on an unsupported assertion of an advancement in technology.

Additionally, as previously discussed, the *Kaplit* reference does not teach a chopper stabilized multi-stage feedforward amplifier. Thus, for at least the reason that the *Kaplit* reference has not been shown to teach or suggest all of the limitations of claim 3, and admittedly does not so teach, and because there is no suggestion or motivation for modifying the *Kaplit* reference to make the invention of claim 3, nor is there a reasonable expectation of success in modifying the *Kaplit* reference based solely on advancement in technology, the Applicants respectfully contend that a *prima facie* showing of obviousness has not been made with respect to claim 3. Consequently, claim 3 is allowable under 35 U.S.C. §103 over the *Kaplit* reference.

Claim 4 is directed to the circuit of claim 2 and further including a rough buffer connected between the input and the amplifier. The Examiner contends that the buffer limitation is old and well known in the art, and it would have been obvious to incorporate the buffer connected between the input and the *Kaplit* reference and the amplifier for buffering or level inverting purposes. (Paper No. 16, page 5.) However, claim 4 does not simply recite a "buffer" but a rough buffer. As an initial

matter, the Applicants do not agree that it would have been obvious to incorporate a buffer into the teaching in the *Kaplit* reference for buffering a level or inverting purposes because there is no suggestion or motivation for doing so - - if such buffering or level inverting purposes were needed, the *Kaplit* reference would have so taught. More particularly, with respect to a rough buffer as recited in claim 4, there is no suggestion or motivation from one of the three possible sources thereof for modifying the *Kaplit* reference to include a rough buffer between the input and the amplifier. *See* MPEP §2143.01. Moreover, as previously discussed, the *Kaplit* reference does not disclose the feedforward multi-stage amplifier incorporated into claim 4 through its dependency chain. ok

Therefore, for at least the reasons that the *Kaplit* reference does not teach or suggest all of the limitations of claim 4, nor is there motivation or suggestion for modifying the *Kaplit* reference to make the invention of claim 4, the Applicants respectfully contend that claim 4 is allowable under 35 U.S.C. §103 over the *Kaplit* reference.

Claim 12 is directed to the circuit of claim 2 fabricated on an integrated circuit. The Examiner asserts that it would have been obvious at the time of the invention of claim 12 and one of ordinary skill in the art would realize that the circuit of the *Kaplit* reference could be an integrated circuit. However, there is no motivation or suggestion to fabricate the circuit of the *Kaplit* reference as an integrated circuit, and in view of the teaching with respect to the particular operational amplifiers would not likely be economically fabricated on an integrated circuit. Moreover, as previously discussed, the *Kaplit* reference does not teach or suggest all of the limitations of claim 2 from which claim 12 depends. Therefore, the Applicants respectfully assert that a *prima facie* showing of obviousness has not been made with respect to claim 12.

The Examiner also asserts that claims 3, 4, 29 and 31 are unpatentable over the *Salem* reference, as applied to claim 2 above. The same reasons as advanced with respect to the *Kaplit* reference are also advanced with respect to the *Salem* reference. (Paper No. 16, page 5.) The Applicants respectfully disagree. As discussed hereinabove, the *Salem* reference has not been shown, and does not teach or suggest all of the limitations of claim 2 from which claims 3 and 4

depend. Furthermore, no rationale or motivation is provided for, with respect to claim 3, implementing the A/D of the *Salem* reference as a delta-sigma modulator. Furthermore, with respect to the rough buffer, as previously discussed hereinabove, the Examiner has not shown that a rough buffer is buffer taught or suggested by the *Salem* reference nor provided a motivation for incorporating a rough as recited in claim 4 into the *Salem* reference.

Claim 29 is directed to a method of designing an integrated circuit including the steps of specifying an input, an output and a chopper stabilized, multi-stage feedforward amplifier connected between the input and output, and specifying the delta-sigma modulator to be connected between the amplifier and the output. Again, the Examiner has not identified teaching in the *Salem* reference directed to a chopper stabilized multi-stage feedforward amplifier nor a delta-sigma modulator connected between the amplifier and an output. Neither has the Examiner provided a motivation or suggestion from one of the possible sources thereof to modify the *Salem* reference to make the invention of claim 29.

Claim 31 is directed to a method of fabricating an integrated circuit, including steps of providing an input, an output, and a chopper stabilized multi-stage feedforward amplifier connected between the input and output, and providing a delta-sigma modulator to be connected between the amplifier and the output. For the reasons discussed hereinabove, there is no suggestion or motivation for fabricating the circuit as recited in claim 31 as an integrated circuit. Likewise, there is no teaching in the *Salem* reference for providing a chopper stabilized, multi-stage amplifier nor providing a delta-sigma modulator between the amplifier and an output of the integrated circuit.

Consequently, for at least the aforesaid reasons, the Applicants respectfully assert that a *prima facie* showing of obviousness has not been made with respect to claims 29 and 31. Thus, claims 29 and 31 are allowable under 35 U.S.C. §103 over the *Salem* reference.

V. ALLOWABLE SUBJECT MATTER

Claims 5-11 have been objected to as being depended upon a rejected base claim that would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. The Applicants appreciate the finding of allowability of claims 5-11.

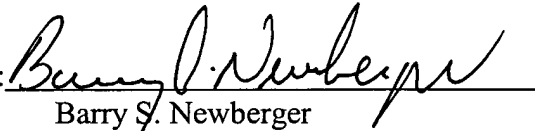
VI. CONCLUSION

As a result of the foregoing, Applicants respectfully assert that the remaining claims in the Application are in condition for allowance and respectfully requests an early allowance of such claims.

The Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

Respectfully submitted,

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